

A NEW SPECIES OF *BIDENS* (ASTERACEAE: COREOPSIDAE) FROM BAJA CALIFORNIA SUR, MEXICO

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ABSTRACT

A new taxon of Asteraceae, *Bidens cabopulmensis*, from the Cape Region of Baja California Sur, is described and illustrated. It occurs on coastal sand dunes. The novelty is not especially close to the other eight known species of *Bidens* from the geographical area and differs by its habitat, life form, and details of the heads. It shares some characteristics with the mainland species, *B. cronquistii*, *B. hintonii*, and *B. triplinervia*. A key to identify the nine known species of *Bidens* native in the Cape Region is provided.

Key words: *Bidens*, Cabo Pulmo, coastal dune flora, Mexico, micro-endemics.

RESUMEN

Se presenta e ilustra un nuevo taxon de asteráceas en la región de Los Cabos de Baja California Sur, *Bidens cabopulmensis*, el cual habita en dunas costeras. Esta especie contrasta con el resto de las ocho especies de *Bidens* del área geográfica correspondiente por su hábitat, forma de crecimiento y particularidades de frutos, pero comparte algunas características con *B. cronquistii*, *B. hintonii* y *B. triplinerviarvia* del interior del país. Se provee una clave para identificar las actuales nueve especies de *Bidens* nativas de la Región de Los Cabos.

Palabras clave: *Bidens*, Cabo Pulmo, flora de dunas costeras, México, micro-endemismo.

The Baja California Peninsula in northwestern Mexico and its adjacent islands (both Gulf and Pacific) constitute a natural region that has been the interest of numerous naturalists and biologists since the mid-nineteenth century. It is one of the largest peninsulas in the world (1400 km long, 40 to 200 km wide), extending southeast-northwest and having almost 4000 km of coastal environments, where geographical isolation from the mainland has been an important factor contributing to its current biotic composition.

The flora of the Baja California Peninsula has been compiled in two monumental treatments: Shreve and Wiggins' *Vegetation and Flora of the Sonoran Desert* (1964) and Wiggins' *Flora of Baja California* (1980). In the latter, 2958 taxa of vascular plants (including 686 endemics) are recognized. Rebman (2001) estimated the current plant biodiversity likely consists of approximately 4000 plant species, 30% of which are endemics. Furthermore, there remain poorly collected areas, where surveys are certain to yield many additional novelties, as in the present contribution.

In 2010, the Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) provided us funding for a project to explore coastal environments of the state of Baja California Sur. During our explorations in the east Cape Region, we collected two interesting specimens from the same geographic area, one of them belonging to the genus *Bidens*, that led to this paper.

First, using the Shreve and Wiggins' (1964) flora, this specimen was compared with *B. ferulifolia* (Jacq.) DC. and the Baja California Cape Region endemic *B. xanti* (A. Gray) B.L. Turner because of the general characteristics of the flowers. However, both taxa were quickly rejected because they inhabit inland environments, such as the oak-pine woodlands of mainland Mexico and the scrublands of the Cape Region, respectively, and are of annual habit.

After collecting and analyzing mature fruits, we concluded that this specimen represents a new species of *Bidens*, based on characteristics such as dimorphic achenes, the peripheral one being incurved and the inner ones being clavate and graded in size. These features are coupled with a perennial habit and the fact that the known population only grows on stabilized coastal dunes, which seems to be its exclusive niche. We consider the population as a new micro-endemic species in the Cape Region.

Bidens cabopulmensis León de la Luz et B.L. Turner, sp. nov. (Figs. 1, 2)

Herba perennis, ramis quadrangularibus, radicibus carnosus striatis. Folia aliquantum succulenta, integra vel in segmentis linearibus divisa. Inflorescentia



Fig. 1. Holotype of *Bidens cabopulmensis*.



Fig. 2. *Bidens cabopulmensis* León de la Luz et B.L. Turner. A. flower, note two yellow tones in ligules; B. involucral view, note foliose outer series and membranous inner; C. involucre, ray and disk achenes; D. plant, immature flower and semi-succulent leaves.

terminalis, in capitulo unico longe pedunculato. Ligulae duobus coloribus flavi variantes. Achenia dimorpha.

Prostrate or sprawling perennial herbs 20-40 cm high; roots striate, semi-succulent, more or less nodose; mid-stems striate, more or less 4-sided, glabrous to sparingly pubescent (mainly in the leaf axils); mature leaves more or less succulent, opposite below, alternate above, undivided to 3-5 pinnately-dissected, sessile, somewhat clasping, basal leaves occasionally linear-lanceolate, the uppermost leaves linear, 3-5 cm long, 2-3(4) mm wide, glabrous or nearly so; capitulescence in a terminal arrangement of solitary heads on ultimate peduncles mostly 5-7 cm long; heads 2.5-3.0 cm across the extended rays; involucre 2-seriate, glabrous; outer series of 8 lanceolate, membranous bracts, semi-succulent, 4-5 mm long;

inner series of 8 lanceolate, sub-membranous bracts, sub-connate basally, hyaline toward the margins, 5-6 mm long, ca. 1.5 mm wide. Receptacle flat; ray florets 8, pistillate, fertile; ligules bright yellow, less so at the base, 1.0-1.2 cm long, 1.5-2.0 mm wide; disk florets 20-30(50); the corollas dark yellow, glabrous, 4-5 mm long, the tube ca. 3 mm long, the throat ca. 1.5 mm long, the lobes 5, acute, ca. 1 mm long; anthers brown, ca. 2 mm long, the appendages ovate; style branches ca 1 mm long, the apices subulate; achenes dimorphic; those from the ray flowers obovate, ca. 5 mm long, 1-2 mm wide, somewhat incurved, having marginal, often incurved, corky wings up to 0.5 mm wide, their awns much reduced or absent; those from the disk flowers, graded in size, linear, the outermost less so, black to grayish, 4-6 mm long, ca. 1 mm wide, pappus of 2(3) divergent awns 1-2 mm long, antrorsely setulose, some (mostly the outer) with corky small protuberances along the posterior side.

Type: Mexico. Baja California Sur, Mpio. de los Cabos, dunas de Punta Arena del Sur, entre La Ribera y Cabo Pulmo, matorral de dunas costeras estabilizadas, 23.535113° N, 109. 479028° W, 2 m, 5 Dec. 2011, *J. L. León de la Luz 11343* (holotype: HCIB-027541; isotypes: ENCB, IEB, LL-TEX, MEXU, RSA-POM). Paratype: same locality, *A. Medel Narváez 11-085*, HCIB-027495).

Additional paratype: Mexico, Baja California Sur, beach near Punta Colorada Hotel, 23.570812° N, -109.515739° W, 2 m, 27.III.1998, *J. J. Pérez 949* (HCIB).

Bidens cabopulmensis is distinct from the previously known *Bidens* species in the Cape Region and even in the Baja California Peninsula, and is not accounted for by previous workers in the area. The achenes of the ray florets, which possess markedly incurved corky margins (Fig. 2c), are especially noteworthy. They are superficially similar to those found in the genus *Coreocarpus*. In Melchert's treatment (2010) of *Bidens* in Mexico this taxon will key to either *B. cronquistii* (*Coreocarpus c.* Sherff), *B. hintonii* (*Coreocarpus h.* Sherff) and *B. triplinervia* Kunth (*B. canescens* Bertol.), due to the dimorphic achenes where at least one type has corky wings, although the semi-succulent roots, growth habit, glabrescent character, and fine characters of the fruiting head are some particularities of *B. cabopulmensis*.

Another Mexican species that inhabits coastal dunes and nearby inland areas (1-10 m) along the Gulf of Mexico states is *B. alba* (L.) DC. var. *alba*, but is easily distinguishable by its prostrate robust habit, white rays, thick, and ample and undivided glabrous leaves (Ballard, 1986).

As circumscribed by Crawford et al. (2009), *Bidens* is a cosmopolitan genus of the tribe Coreopsidae represented by approximately 340 species and subspecific categories, of which about 56 occur in Mexico. Formerly and according to Villaseñor (1991), *Bidens* belongs to the tribe Heliantheae, one of the more diversified taxa of Asteraceae in Mexico, where approximately 65% are endemics. Also, the account of Mexican species of Heliantheae and its endemism show that the Baja California Peninsula is the natural region with the highest level. Additionally, plotting geographical distribution of the endemic peninsular Heliantheae, a clear tendency toward the southern tip is manifested.

Following Melchert's (2010) treatment of Mexican *Bidens*, the Cape Region of Baja California contains eight species: *Bidens pilosa* L. (= *B. alba* (L.) DC. var. *radiata* (Sch.-Bip.) Melchert), *B. aurea* (Ait.) Sherff, *B. nudata* Brandegees, *B. lemmonii* A. Gray, *B. leptcephala* Sherff (= *B. l.* var. *hammerlyae* Sherff), *B. riparia* Kunth, *B. shaffneri* (A. Gray) Sherff var. *wrightii* (Sherff) Melchert, and *B. xanti* (A. Gray) B.L. Turner. Of these, only *B. nudata* and *B. leptcephala* var. *hammerlyae* are recognized as endemics to Baja California Peninsula, both inhabiting the southern sector in Sierra de La Laguna, in the oak-pine woodland and dry tropical forest communities, respectively.

A dichotomous key is provided below to differentiate *B. cabopulmensis* from the other eight taxa of *Bidens* previously recognized in the Cape Region, this largely abstracted from Melchert (2010) as follows:

- 1a. Plants annual (2)
 - 2a. Flowering heads conspicuously ligulated (3)
 - 3a. Rays white when fresh, habit erect *B. alba* var. *radiata*
 - 3b. Rays yellow when fresh, habit prostrate *B. xanti*
 - 2b. Flowering heads inconspicuously ligulated or completely discoid (4)
 - 4a. Leaves with broadly ovate to lance-ovate segments, stems square (5)
 - 5a. Heads with five very small inconspicuous yellow rays *B. riparia*
 - 5b. Heads consistently discoid *B. pilosa*
 - 4b. Leaves linear, stems terete or somewhat angulated (6)
 - 6a. Leaves undivided, narrowly linear or linear-filiform *B. lemmoni*
 - 6b. Leaves pinnatisect with linear divisions
 - *B. leptcephala* var. *hammerlyae*
- 1b. Plants perennial (7)
 - 7a. Plants tufted and suffruticose *B. nudata*
 - 7b. Plants erect herbs, sometimes decumbent or sprawling (8)

- 8a. Leaves mostly undivided, rarely parted, with narrowly to broadly lanceolate segments, 5-35 mm wide and 4-6 cm long, margins with coarse teeth, all similar in shape *B. aurea*
- 8b. Leaves mostly 3-parted, rarely undivided, with long linear-lanceolate segments 2-8 mm wide and 5-8 cm long (9)
- 9a. Heads in terminal corymbiform capitulescences
..... *B. schaffneri* var. *wrightii*
- 9b. Heads solitary terminal *B. cabopulmensis*

Distribution and ecology. The novelty occurs on stable dunes in the vicinity of Punta Arena del Sur or “El Faro de Punta Colorada”, in a relatively small area between 23.563373° and 23.517585° N and -109.487397° and -109.469452° W, and occasionally in the proximities, occupying a total surface area of approximately 200 hectares. Plant density is estimated at one individual per 100-200 m².

Phenology. Flowering usually extends from July through December.

Etymology. The taxon is named for the village of Cabo Pulmo, an eco-touristic settlement near one of the few coral reefs along the American Pacific coast and now seriously menaced by touristic developments along the east Cape Region.

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